XVIII.—*Notes on some Objects from a Neolithic Settlement recently discovered by* Mr. W. H. P. Driver *at Ranchi in the Chota-Nagpore District.*—*By* J. Wood-Mason, *Superintendent of the Indian Museum, and Professor of Comparative Anatomy in the Medical College of Bengal, Calcutta.*

[Received and Read January 4th, 1888.]

(With Plates II—V.)

At a recent meeting of this Society some ancient stone beads were exhibited by the Philological Secretary on behalf of Mr. W. H. P. Driver, who had found them at Ranchi in the Chota-Nagpore District. With these beads were associated one or two pieces of chert and some quartz crystals which had evidently been artificially chipped and flaked. The presence of these worked pieces of stone amongst the beads suggesting the suspicion that a settlement of neolithic people similar in character to those of Jubalpur in the Central Provinces had been hit upon, I, with the goodwill of the Philological Secretary, placed myself in communication his correspondent, who has been kind enough to send me all the larger of the objects described below and, at my special request, a considerable quantity of fragments of different kinds of stone gathered without selection from the same site. Amongst the latter I have had the good fortune to find a number of arrow-heads belonging to two distinct forms of the same simple type.

Objects discovered by Mr. Driver.

Pl. II. represents a curious implement of olive-green grey unctuous clayey stone which readily absorbs moisture from the hand and gives an ashy-grey streak when grazed, however lightly, by a harder substance such as chert. It tapers from 20 c. in girth at the butt to 13 c. at the functional end, which is worn as smooth as a piece of lithographic slate that has been prepared for the engraver, exhibiting only some very fine scratches chiefly in one direction. It has three sides, two of which are fairly smooth and flat, and at right angles to one another, while the third is rough and convex. All three sides have been 'dressed' by some tool, which in the case of the rough convex side seems to have been pointed. The marks of the 'dressing' are ashy grey of a somewhat darker tint than the fresh streak of the stone. If, as seems probable, the rough convex side has been so fashioned as to fit the hollow palm of the hand (as in Fig. 1), the instrument is a right-handed one, and must have been worked to and fro the body of the operator, in the direction, that is to say, indicated by the scratches on the surface

of its smaller end. A second specimen in Mr. Driver's collection differs only in being a little shorter.

	Millems.
Height from butt to functional end, ...	84
Width of larger flat side at butt, ...	65
„ „ „ at functional end,...	36
„ smaller flat side at butt, ...	48
„ „ „ at functional end,...	32

From the nature of the unmistakable signs of wear it exhibits at the smaller end, as from that of its composition, I infer that this implement was used as a polisher, though this may not have been its original use, for it is possible that it may once have been one of the 'legs' of a two-legged instrument similar to one of unknown origin and use preserved in the Indian Museum, in which case the two examples of it, being of the same side, must necessarily be parts of two similar instruments.

A triangular wedge-shaped piece of dark purple flinty jasper bears evident signs of long use as a polisher or graver or both possibly. It is worn to a smooth, polished, and slightly convex surface on one of its two large faces, the other large face and its three sides presenting the natural surface of the parent rock from which it was chipped; it is smoothly and extensively rounded off and polished by use at the junction of its two largest sides, along the lower edge of which the polishing extends, widening on the one side towards the thin end of the wedge, and forming on the other a very narrow triangular facet meeting the principal polished surface at an obtuse angle, by which the circumferential grooves with which some of the stone beads* occurring in the same spot are ornamented may well have been engraved. The instrument is capable of imparting a high polish to a dull facet of a quartz crystal or to a carnelian bead, and it is an excellent touchstone, as I have proved by experiment.

	Millems.
Length, from the angle at thicker end to middle of thinner end, ...	60

* These beads are doubtless of much later age than the celt, the ringstone, and the arrow-heads described below. That they, like the prehistoric objects, were made on the spot where they have been found seems satisfactorily proved by the association with them of bits of stone of different kinds (chalcedony, carnelian, onyx, sardonyx, rock-crystal, etc.) dressed roughly into shape all ready to be ground into beads, of roughly ground and imperfectly polished, but unbored, beads, of beads perfectly polished and partially bored, in fact, of beads in all stages of manufacture. They belong clearly to several different periods, some being quite rude (? prehistoric), and others quite artistic both in shape and ornamentation, and thus indicating that their manufacturers had attained to a much higher grade of civilization.

Breadth, between the divergent ends of the two sides,	76
Thickness at angle, ...	78

I do not consider that either of the foregoing objects is of any great antiquity. They may both indeed be comparatively modern.

The most interesting of Mr. Driver's own finds is the perforated stone figured in Pl. III, Figs. 1, 1*a*. Unfortunately, little more than one half of the object has been preserved, but from what remains restoration is easy. The instrument is made out of a bit of actinolite schist. It is all but as broad as long, and oval in shape, with one end much broader than the other, which is a much larger segment of a much smaller circle; it has, in fact, much the outline if an irregular echinoid of the genus Echinodiscus. It was apparently slightly and equally convex in every direction on both its faces, and rounded at the sides and ends, the broader one of which latter appears to have seen hard service. It has a parallel-sided shaft-hole almost in the middle, and in the margin of this hole on one side a broad notch has been cut cleanly and obliquely across the fissile planes of the stone and may possibly have been intended to receive a pin for securing it firmly to a wooden shaft.

	Millems.
Greatest length (taken from the restoration), ...	87
„ breadth, „ „	83
Diameter of shaft-hole, ...	19
Greatest thickness near shaft-hole, ...	26

The next object to be noticed is a thin and flattish celt (Pl. III, Figs. 2, 2*a*.) probably of black trap. It never appears to have been polished all over, but only to have had the principal inequalities of its surfaces smoothed off and its edge ground. Its sides, which were possibly once narrowly rounded, are now in a much battered and flaky condition; the butt has been much chipped since the rough polishing was done; and the cutting edge, which is unequally sloped on the two sides, is much broken and blunted by rough usage; all these lesions are probably of the same date, for they are all weathered to identically the same dark greenish grey colour; but a large chip at one end of one face of the cutting edge is darker, that is to say, is less weathered, and hence probably of later date, than the rest, but even it presents a strong contrast in colour to the recent chip at the opposite end of the same face by which the unaltered black rock has been exposed.

	Millems.
Length, from the middle of the butt to the middle of the cutting end, ...	71
Breadth across the butt end, ...	32
„ „ cutting end, ...	51
Greatest thickness, ...	16·5

Objects discovered by the Writer amongst the chips and flakes sent down by Mr. Driver.

Pl. IV, Fig. 10, represents a small instrument of doubtful purpose, which is interesting on account of the evident signs of having been used it exhibits at its smaller and rounded extremity, which is much abraded, the abrasion readily catching the eye from its grey colour. It is an outside flake of black chert which has apparently been reduced by flaking to the desired shape after being struck off from the parent lump. It measures, length 34, breadth 10, thickness 4·2 millems. This instrument will again be referred to later on.

I now pass on to the consideration of the most interesting and important of the objects from the Neolithic settlement at Ranchi, namely, the arrow-heads I have found in relatively considerable abundance amongst the mass of cores, flakes, and unworked material collected for manufacture which had been gathered and forwarded to me by Mr. Driver, who, since the nature of these objects was demonstrated to him by me, has been fortunate to find two fine specimens, one of rock crystal and the other of chert.

With the single exception of the acutely-pointed tanged and barbed specimen reported from India by Mr. John Evans, F. R, S.,* on the authority of Prof. Buckman, no *worked* stone arrow-heads appear to have previously been recorded from India. For, though my friend Professor Valentine Ball, F. R. S., in his paper on the Forms and Geographical Distribution of Ancient Stone Implements in India,† states with the greatest confidence that certain flakes of chert, agate, etc., which he exhibited at the reading of his paper, "were undoubtedly used as lancets, knives, arrow-heads, etc.," yet he does not appear to have been acquainted with a single specimen the nature of which as an arrow-head was so clear and so indisputable as to justify its being entered as such in the list of localities in India where stone implements have been discovered which is appended to his paper. Mr. R. B. Foote, another authority on this interesting subject, in a paper recently read before this Society, speaking apparently for India generally, makes the following remarks, "A remarkable fact with reference to the varieties of weapons and tools made by the Neolithic people of South India is the absence hitherto of any traces of their having manufactured stone arrow-heads, such as are frequently found in other countries occupied by tribes who had attained to a very similar grade of civilization. It is hard to imagine that the Neolithic people of the Deccan were unacquainted with the

* Ancient Stone Implements of Great Britain, p. 361.

† P. R. I. A. 1879, ser. 2, vol. p. i, 388 et seqq.

use of the bow prior to the first introduction of iron. That they used brass after becoming acquainted with iron is clearly proved by the discovery of unquestionable iron arrow-heads in the Pátpád cache and in many prehistoric graves in the South. With an abundance of stone, such as agate, chalcedony, lydian stone, jasper, and chert, fit for making arrow-heads, it is certainly most remarkable that no true worked arrow-heads have yet been found, and it is most desirable that all prehistoric explorers in India should pay special attention to this point. I have found some few flakes of chert and jasper that might have been used to tip an arrow, but I have found and seen none that were obviously prepared for that purpose."

Of the objects which have been determined by me to be arrow-heads no less than six, four of one and two of the other of the two distinct forms represented in the collection from Ranchi, are without doubt of this nature, for in addition to having the appropriate shape, in addition to being of such a form that they might have been used to tip an arrow, they have been obviously prepared for that purpose, having been artificially worked either near the butt or at the sides into notches for the reception of cords for securing them to their shaft.

The specimen represented in Fig. 1 of Pl. IV, a very sharp and perfect one of chalcedony, has the butt-end roughly notched. It is much weathered white and clings strongly to the tongue when touched thereby.

That represented in Fig. 2, of black chert, has the butt worked by chipping and abrasion into very evident lateral notches; its point has been broken off at a joint in the stone. The working at the butt is less weathered than the stem, or rather the stem is only slightly weathered and the worked butt looks almost quite fresh, and glossy.

Fig. 3 represents a coarse and heavy specimen of chert deeply weathered to a dirty pale clay brown from black probably; it is blunted either by use or exposure, at the tip; it has been roughly worked at the sides towards the base into notches, and when mounted on its shaft must have been covered for nearly half its length from the butt by the cords and resin or gum by which it was no doubt bound to its shaft, to which it must have lent a rather clumsy appearance.

Fig. 4, of black non-weathered chert, is widest at the butt and therefore was well adapted for secure fixture to the shaft without the aid of any notches.

Fig. 5 is a particularly interesting specimen, because it without any doubt presents us with a most characteristic example of a contrivance for attachment which is, or until lately was, still in vogue amongst modern savages for their arrow and lance-heads, and of which numerous

beautiful examples have come down to us from prehistoric times in Europe. I allude to the notches which are placed opposite to one another one on each side between the barbs and the stem in one form of arrow-head, and of which two pairs are present in some European flint spear-heads of Neolithic age. The specimen from Ranchi which exhibits this interesting peculiarity is a broad leaf-shaped arrow-head of white quartz. It bears on each side at rather less than half way along its length from the butt a rounded indentation, by the aid of which doubtless it was attached to its shaft much after the manner depicted in the accompanying adaptation of Fig. 104 of Nilsson's 'Stone Age' representing a stone arrow-head from California mounted on its shaft.

Fig. 6 represents a chert arrow-head found by Mr. Driver. This specimen—the original colour of which cannot be ascertained, because it is weathered to a dirty clay grey—has no notches, but on the contrary has the base semicircularly rounded, like typical British leaf-shaped arrow-heads* of Neolithic age.

Fig. 7 is a rock-crystal arrow-head found by Mr. Driver. It is worked into a slight notch on each side of its thick tang-like base.

Figs. 8, 9, and 12 of Pl. V represent three simple trihedral arrow-heads—all of black chert—of which Fig. 8 is slightly weathered, 11, scarcely at all weathered, presents a large notch on the right side, and 12, weathered to the colour of fuller's-earth, a projection on the left side. All three are so shaped as readily to have been secured to their shafts by cords and gum without the aid of special notches.

Fig. 10 represents an octahedral arrow-head roughly but skilfully hewn out of rock crystal.

Fig. 6 is a not very successful representation of a pretty little leaf-shaped specimen in milky quartz, and Fig. 7 another of similar form in reddish chert.

Fig. 11, similar in form to that represented in Fig. 6 of Pl. IV, is of pale brown-coloured chalcedony weathered white so as to be adherent to the tongue like the subject of Fig. 1 of Pl. IV.

The most interesting and remarkable of all the objects I have picked out of the material so kindly gathered for me by Mr. Driver are unquestionably those represented in the first five figures of Pl. V. Four of them are, there can, I think, be no doubt, chisel-edged arrow-heads similar to those which have been found in Egyptian tombs†—in several cases still secured by bitumen to the shaft,—and on Neolithic sites in different parts of Europe,‡ including even the British Isles.

* Evans, op. cit. 333, figs. 281—4.

† Evans, op. cit. p. 329, fig. 272.

‡ Evans, op. cit. p. 352, 353, fig. 342, and Espy. p. 365, fig. 344.

Fig. 1, Pl. V is of black chert with the original brown crust remaining on one side and on the butt end; its hollow cutting edge and its angles are extremely sharp.

Fig. 4 is a pretty little specimen in green chert.

Fig. 3 of slightly translucent black chert, with the original grey-crusted surface of the parent stone remaining on the triangular facet which slopes to the cutting edge, has it angles obliquely and symmetrically cut off.

Of the four specimens which are here figured and described as arrows of the chisel-edged type, Fig. 2 is the most interesting from the presence of lateral notches for the reception of ligaments rendering it, to say the least, in the highest degree probable that the specimen is a veritable arrow-head of the chisel-edged type and enabling one to feel more sure that the nature of the three specimens that possess no notches has been correctly interpreted. It is of opaque reddish yellow chalcedony weathered white and become strongly adherent to the tongue by long exposure to the action of water containing carbonic anhydride in solution, by which a soluble constituent of the stone has been removed from the surface and a chalky substance greedy of moisture left behind.* In this case both the notches have been made from the same side, but in the cases of Figs. 2 and 5 of Pl. IV, from opposite sides, of the stone, opposite faces of the arrow in the latter and the same face in the former sloping to the bottom of the notches; this difference is, as I find by experiment, explained by the worker having turned the stone over for the purpose of making the second notch in the latter, but not in the former. I have also found that similar notches can readily be made by pressing such a flake as that represented in Fig. 10 of Pl. IV with a grating movement hard upon another of the same substance, and that the active flake becomes similarly abraded grey in the process.

In the four preceding figures (*a.*) refers to the inner or core face, and (*b.*) to the outer or worked face of the arrow-head.

Fig. 5, of very fine grained and compact pale grey vitreous quartzite, has been worked at the base in a manner similar to Fig. 2 of Pl. IV, and is, I am inclined to think, an arrow-head of the same type which has become a chisel-edged one by the accidental loss of its point at a joint in the stone.

A form of worked flake which is, I think, of too frequent occurrence to be accidental merits a brief notice. It may be described as a broad and short crescent-like sharp wedge from 21 to 35 millems. in

* The (α) and the (β) silica of Berzelius, the one white and insoluble, the other transparent horny and soluble in water. Evans, op. cit. p. 450.

breadth by 7 to 11 in length only, with a straight cutting edge and a finely chipped arched blunt 'back.' It occurs in chert, chalcedony, and quartz. It is possible that it may be a short and broad form of the chisel-edged type intended to be attached to its shaft by means of some resinous substance only, and that it may be the stone prototype of the iron-headed arrow of similar shape which is referred to by Mr. Evans on p. 353 of his book on the ancient stone implements of Great Britain.

That all the arrow-heads were made on the spot where they have been found seems to be satisfactorily proved by flakes, cores, and raw materials for manufacture occurring in profusion with them.

The form and relations of the cores, flakes, and arrow-heads suggest the view that the last-named were first sketched out, so to speak, by flaking on the nuclei, then struck off, and finally notched or otherwise worked.

The chert core represented in Fig. 8 of Pl. IV partially illustrates this. Fig. 9 is a chert core from which some of the thin band-shaped flakes that are so abundant at Ranchi have been struck. Cores of quartz crystals and rock crystal also occur.

I class all the worked specimens as notched rather than as 'tanged' arrow-heads, because there has been no attempt to adapt the flakes for insertion in a cleft of the shaft by reducing their original thickness at the butt, and because there is always a more or less distinct 'neck' between the butt-end and the blade; though I do not insist that none of them were let to some extent into the shaft.

All the arrows (except 7 and 10 of Pls. IV and V) are flakes and they present two faces, a flat or inner or core face, with a more or less evident bulb of percussion, and a flaked outer face. They may be called flake-arrows. The simplest of them closely resemble the obsidian flake arrow-heads of modern savages.

The following are the measurements of the arrows-heads and cores :—

Pl. IV.

Fig. 1.	Length, 38,	breadth 16,	thickness 8·5	mm.
2.	Length, tip restored, 26 without tip 20·4,	breadth 12·2,	thickness 4	,,
3.	Length, 43,	breadth 24·5,	thickness 10·8	,,
4.	Length, 21·4,	breadth 16,	thickness 7·7	,,
5.	Length, tip restored, 26·3 without tip 23·6,	breadth 21·5,	thickness 6·8	,,
6.	Length, tip restored, 28·0, without tip 26·7,	breadth 15·0,	thickness 5·7	,,

7. Length 29·5, breadth 15·6, thickness 8·4 mm.
8. Length 20·4, breadth 14·9, thickness 18·5 ,,
9. Length 37, breadth 27, thickness 17·8 ,,
10. Length 34, breadth 10, thickness 4·2 ,,

Pl. V.

Fig. 1. Length 19·8, breadth 12·8, thickness 6·3 ,,
2. Length 21·7, breadth 18, thickness 6·6 ,,
3. Length 17·8, breadth 15·5, thickness 5 ,,
4. Length 13·3, breadth 12·8, thickness 5·8 ,,
5. Length 23·7, breadth 14·7, thickness 4·9 ,,
6. Length 19·4, breadth 13·2, thickness 3·7 ,,
7. Length 17·5, breadth 10·1, thickness 3·8 ,,
8. Length 23·0, breadth 14·5, thickness 6·7 ,,
9. Length 35·5, breadth 15·0, thickness 14·4 ,,
10. Length 28·7, breadth 21, thickness 14 ,,
11. Length 25·3, breadth 15·1, thickness 8 ,,
12. Length 35·6, breadth 16·6, thickness 10·5 ,,

As in Neolithic settlements elsewhere, there occur in abundance at Ranchi, in the soil with the implements, not only unworked quartz crystals, quartz of various kinds, chert, jasper, and other stones, suitable for the manufacture of tools and weapons, and evidently collected for that purpose, as has already been stated, but also lumps of red earthy hæmatite,* some of which have not been used, but some on the other hand have been rubbed down to a smooth surface on a flat stone or scraped in the production of the red pigment which all savages from the very earliest prehistoric times to the present day have delighted in. On the subject of this red pigment Mr. Evans† writes: "There can be little doubt of this red pigment having been in use for what was considered a personal decoration by the Neolithic occupants of Great Britain. But this use of red paint dates back to a far earlier period, for pieces of hæmatite with the surface scraped, apparently by means of flint flakes, have been found in the French and Belgian caves of the Reindeer Period, so that this red pigment appears to have been in all ages a favourite with savage man. The practice of interring war-paint with the dead is still observed amongst the North American Indians:—

> The paints that warriors love to use
> Place here within his hand,
> That he may shine with ruddy hues
> Amidst the spirit land."

* It has been recorded from the Neolithic Settlements of South India, by R. B. Foote, J. A. S. B. 1886, vol. lvi, pt. ii, p. 271.

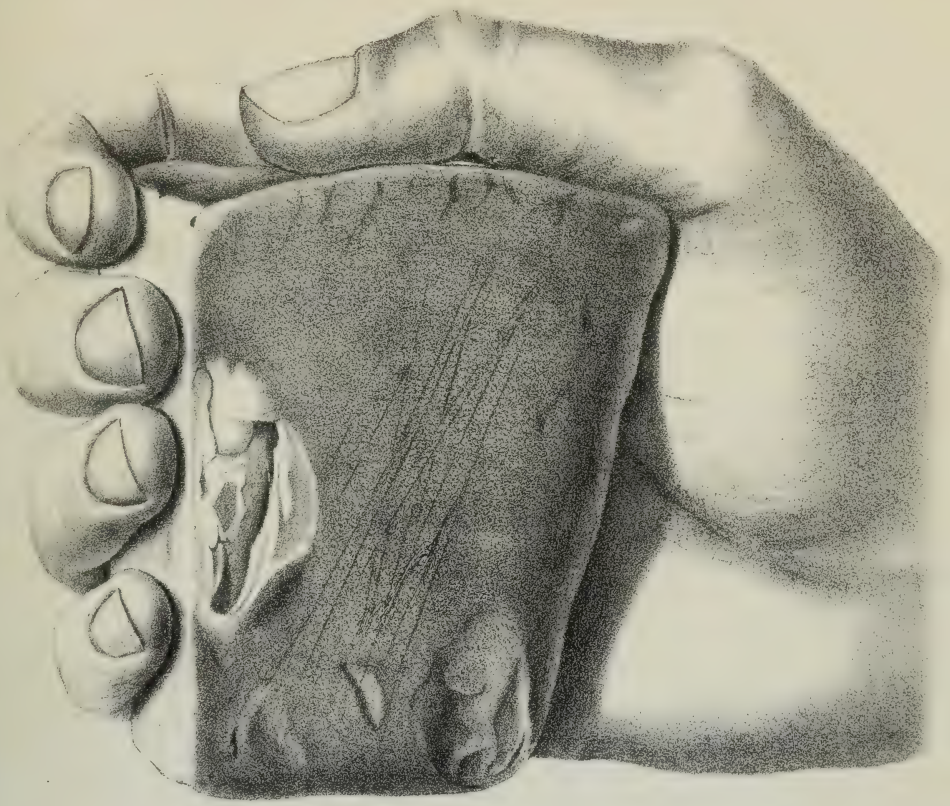
† Op. cit., p. 238.

The savages of the Andaman Islands still use a red pigment for decorative purposes, as also do the Bhutea women to be seen in Darjeeling.

Worked flints and other stones of similar palæolithic simplicity, but from their mode of occurrence no doubt also neolithic, have been discovered in the Solomon Islands (Long. 154° to 163° E., Lat. 5° to 11° S.) by Mr. H. B. Guppy,* who states that they "are commonly found in the soil when it is disturbed for purposes of cultivation and are frequently exposed after heavy rain."

P. S.—Since the above notes were written, several more boxes of relics, including some fine polished celts, of which I hope shortly to present an account, have been received from Mr. Driver.

* The Solomon Islands and their Natives, London, 1889, pp. 77—78.



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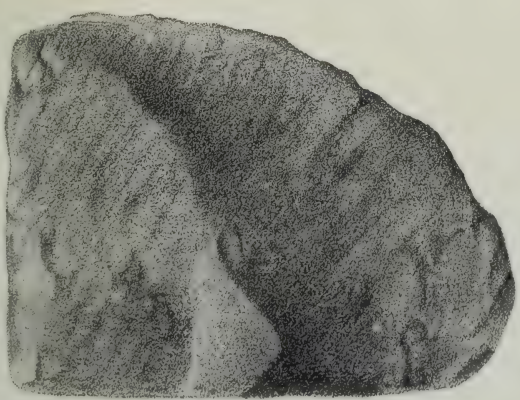

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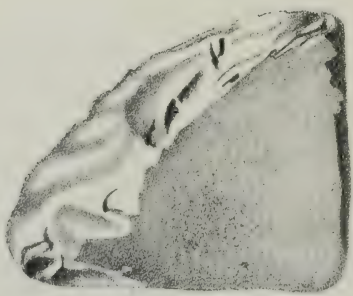

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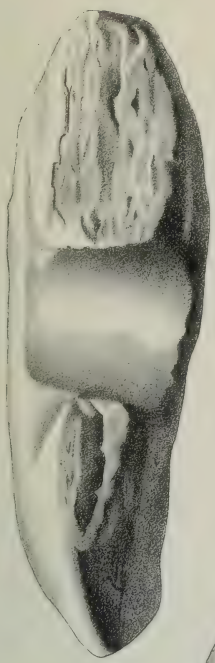
B. L. Dös, del.
Parker & Coward, lith.
West, Newman & C.o imp.



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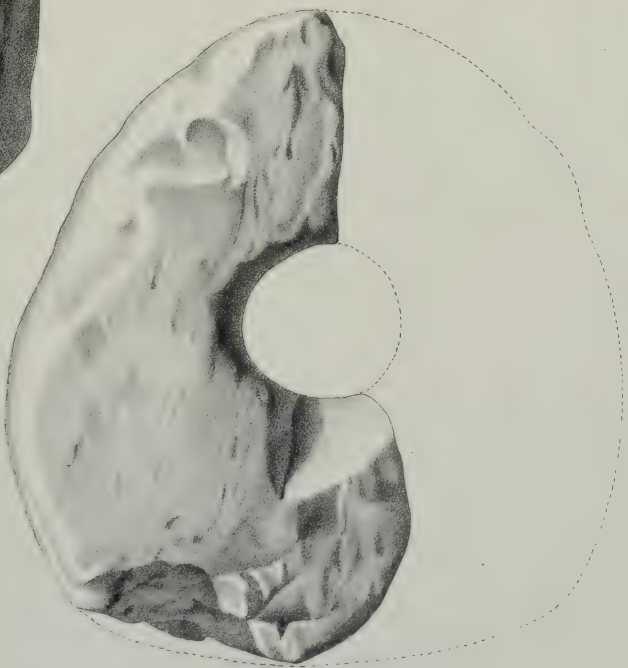

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Parker & Coward, lith

West, Newman & C° imp

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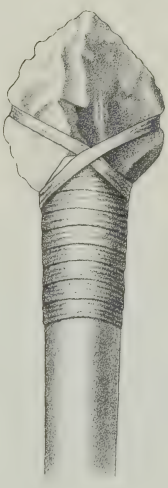

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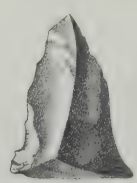

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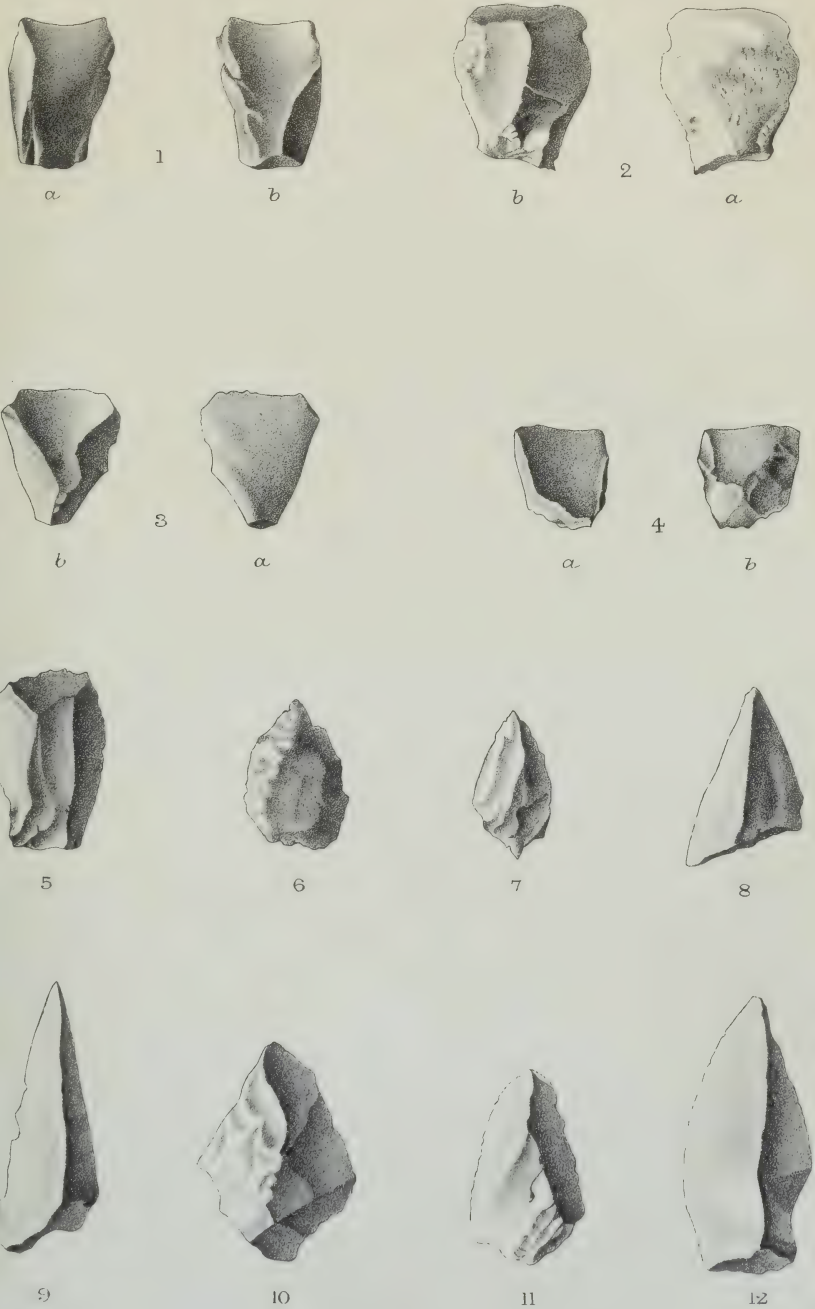

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